Abstracts

Characterization of Nonlinear Interactions in Avalanche Transit-Time Oscillators, Frequency Multipliers, and Frequency Dividers

K. Mouthaan. "Characterization of Nonlinear Interactions in Avalanche Transit-Time Oscillators, Frequency Multipliers, and Frequency Dividers." 1970 Transactions on Microwave Theory and Techniques 18.11 (Nov. 1970 [T-MTT] (Special Issue on Microwave Circuit Aspects of Avalanche-Diode and Transferred Electron Devices)): 853-862.

Equivalent circuits are introduced for nonlinear operation of the avalanche transit-time diode at a single frequency and at two harmonically related frequencies. Parameters are derived that characterize the nonlinear interaction between the diode and the associated microwave circuit. Particular attention is devoted to the oscillator, the frequency multiplier, and the frequency divider. For the oscillator, parametric interaction with a harmonic of the desired oscillation frequency is shown to give possibilities of enhancing the output power and of significantly improving the noise performance. An experimental two-frequency oscillator is described that has confirmed the theoretical predictions.

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